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EXPLANATION OF SIGNIFICANT DIFFERENCES

INTRODUCTION

Site name and location:

Lakewood/Ponders Corner (Lakewood)

Lead and support agencies:

U.S. Environmental Protection Agency (EPA)
Washington Department of Ecology (Ecology)

Statutes that require Explanation of Significant Differences (ESD):

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117 (c) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i)

Need for an ESD:

On September 30, 1985, EPA signed the Record of Decision (ROD) for the Lakewood Superfund site. Since that time, an amended ROD addressing four major areas affecting the original remedial decision was signed on November 14, 1986. The changes included a significant reduction in the amount of contaminated soil requiring excavation and off-site disposal from the three existing septic tanks; the construction of a soil vapor extraction system (SVES) to treat soils in place which substantially augments remediation associated with excavating and disposing of contaminated soil off-site; effectuating a cost savings by implementing the soil treatment process instead of the soil removal and disposal remedy; and, implementing a more environmentally acceptable remedy since SVES would permanently treat contaminated wastes and eliminate the uncontrolled volatilization of contaminants resulting during excavation.

There are three issues which were not addressed in either the original ROD or the Amended ROD. This Explanation of Significant Differences (ESD) documents the revisions needed in order to comply with the original ROD, Amended ROD and regulatory requirements. The three issues are: (1) establishment of site-specific cleanup levels for contaminants in soil and groundwater; (2) final remedial action necessary to remove the source of contamination at the site; (3) and, elimination of the requirement to implement institutional controls on land and groundwater use.

Establishment of site-specific cleanup goals: Site-specific remedial cleanup levels for both the contaminated groundwater and

soil were not established in either the ROD or the amended ROD, but were deferred pending evaluation of site-specific conditions and regional characteristics. Soil and groundwater cleanup levels are being designated as part of this ESD. These cleanup levels will be consistent with the current federal and state standards for the contaminants of concern. The contaminant in soil is tetrachloroethylene (PERC). The contaminants in groundwater are cis-1,2 dichloroethylene (cis-1,2 DCE), tetrachloroethylene (PERC) and trichloroethylene (TCE).

Final soils unit remedial action: Cleanup of site soils began in 1983 when the owners of Plaza Cleaners agreed to send drummed sludge from the on-site sludge removal areas to an approved off-site disposal facility. In 1987, EPA successfully removed contaminated solids and any water from three, on-site septic tanks (which were used for disposal of dry cleaning wastes) and disposed of the contaminated material off-site. The remainder of the contaminated soil within the septic tanks and around the historical drain field was treated using a soil vapor extraction system to levels protective of human health and the environment.

Field notes from the 1987 removal indicated that some sludge was left below one of the bottomless septic tanks when efforts were made to excavate their contents. At the time of the removal, rice hull ash was added in an attempt to solidify the sludge. However, the resulting "hot spot" contained high concentrations of PERC.

EPA recently completed final remediation of this area in July, 1992 by excavating the contaminated sludge which is currently stockpiled in containers on-site. The contaminated sludge is awaiting transport to an approved off-site treatment facility for incineration. Contaminated soil from above and around the contaminated sludge, which was also excavated during the final remedial action but does not require incineration prior to land disposal, has been stockpiled on-site and will be transported to an approved hazardous waste facility for disposal. All contaminated waste will be removed from the site by the end of September, 1992.

Institutional Controls:

Elimination of land use restrictions: The success of the final soil remedial action has eliminated the need for institutional controls (as called for in the original ROD) on land use.

Maintenance of current groundwater use restrictions: Since initiation of the groundwater treatment program, EPA has utilized public outreach and education to implement administrative restrictions on the installation and use of drinking water wells

within the contaminated area. Homeowners who currently have or could potentially install private drinking water wells within the plume of contamination and well drillers were notified and will again be reminded of potential risks associated with groundwater use in the area.

Elimination of future groundwater use restrictions: Other institutional control measures on groundwater use such as deed restrictions, are considered unnecessary. The use of public outreach and education, including written notification of current limitations on groundwater use, are sufficiently protective of human health and the environment. Once groundwater standards have been achieved, these measures will no longer be necessary.

Extraction, treatment and monitoring of contaminated groundwater will remain the hazardous waste management approach for the Lakewood site. The remedial action will continue to be protective of human health and the environment, and consistent with the NCP.

Document Availability:

The ESD will become part of EPA's site file for the Lakewood Superfund site which serves as the Administrative Record for this pre-SARA site. The file is available to the public at the following location:

U.S. Environmental Protection Agency
1200 Sixth Avenue, HW-113
Seattle, Washington 98101

SITE BACKGROUND

The Lakewood site is located south of the city of Tacoma, Washington. It includes the property upon which Plaza Cleaners has operated a dry cleaning business for many years. The regional aquifer is also contaminated within an approximate 2,000-foot radius downgradient of Plaza Cleaners. The Plaza Cleaners property is bounded by Interstate 5 to the south, and surrounded on the remaining three sides by a commercial/light industrial area. Farther north is a predominantly residential area. Lakewood Water District has two of its production wells (H1 and H2) on a fenced area south (downgradient) of Plaza Cleaners, across Interstate 5. Residential property lies to the east, and McChord Air Force Base to the southeast, of the wells.

In July 1981, EPA sampled drinking water wells in the Tacoma area for contamination by volatile organic compounds. The tests indicated that wells H1 and H2 were contaminated with TCE, PERC and cis-1,2 DCE. The source of the contamination was determined to be Plaza Cleaners, a dry cleaning and laundry business, located approximately 800 feet north (upgradient) of the Lakewood

Water District production wells. In August 1981, H1 and H2 were temporarily taken out of service while monitoring wells were installed and contaminated surficial soil in the source area was excavated.

A stipulated agreement for remedial action was reached between Ecology and Plaza Cleaners in September, 1983. Plaza Cleaners agreed to discontinue their prior solvent disposal practices, install a system for reclaiming cleaning solvents, and send drummed waste water and sludge to a suitable off-site disposal facility. Contaminated soil from the on-site sludge removal areas was replaced with clean fill. Plaza Cleaners successfully fulfilled the terms of the agreement.

In May 1984, EPA completed a focused feasibility study (FFS) identifying an Interim Remedial Action (IRM) needed to address those contaminant problems posing the most immediate threat at the site. The objectives of the IRM were to: (1) restrict the spread of contamination within the aquifer; (2) restore normal water service to the area; (3) and, initiate groundwater treatment as quickly as possible. By November 15, 1984, two air strippers had been installed to treat wells H1 and H2 and were fully operational following implementation of the IRM.

REMEDIAL INVESTIGATION (RI) AND CONTAMINATION PROBLEMS

EPA's contractor conducted a remedial investigation from August 1984 to July 1985 to further determine the extent of groundwater contamination at the site, test the soil at Plaza Cleaners for remaining contaminants, and determine whether other sources were contributing to the groundwater problem. The field work conducted during the RI included:

- installation of nine deep and three shallow monitoring wells to provide a comprehensive picture of the groundwater regime (e.g. flow patterns, hydraulic connections between layers); determine the nature/extent of groundwater contamination; and, identify possible sources of the contamination.
- excavation of the waste line at Plaza Cleaners and drilling of seven soil borings to determine the extent/character of remaining sources of contamination at Plaza Cleaners, and to determine if other sources besides Plaza Cleaners exist.
- collection of samples for field and laboratory analysis to determine the extent/concentration of soil and aquifer contamination within the study area.

The dry cleaning operation's discharge of solvents into its bottomless (i.e. permeable) septic system and the disposal of

other wastes containing solvents onto the ground outside their building were suspected of causing the soil and groundwater contamination. It was later confirmed that contamination had resulted from effluent discharges from septic tanks behind the Plaza Cleaners building and sludge disposal on the ground surface.

Ecology found that supernatant (liquid overlying material deposited by settling or precipitation) in the dry cleaner's septic system contained 550 parts per billion (ppb) PERC and 29 ppb TCE.

Data for the two production wells (H1 and H2) ranged from 100 to 500 ppb PERC prior to initiating the groundwater treatment. Contaminant concentrations decreased rapidly after several days of pumping, and have continued to decrease. Maximum and mean concentrations in other groundwater monitoring wells within the study area prior to treatment were: PERC- 922 ppb and 16 ppb, respectively, and: TCE- 57 ppb and 3 ppb, respectively. The only detected concentration for cis-1,2 DCE was 85 ppb in a monitoring well upgradient of the production wells.

The RI indicated that PERC contamination in soils was highest where solvent-contaminated wastes were intentionally disposed on the ground surface. Except for several small pockets of contamination, most of the PERC from the soil borings and test pit was located in the upper 12 to 13 feet of soil in the immediate vicinity of the dry cleaner's septic tanks and drain field. Where it was detected, PERC concentrations ranged from 11 to 3,800 ppb. The average PERC concentration in soils was 500 ppb. Maximum TCE and cis-1,2 DCE concentrations in soil were 5 ppb and 4 ppb, respectively.

REMEDY SELECTED IN THE ROD AND AS REVISED IN THE AMENDED ROD

The Feasibility Study for the Lakewood site was published in July 1985, and the ROD was signed shortly thereafter on September 30, 1985.

The remedy selected in the ROD consisted of the following major elements:

- * Continued operation of the H1-H2 production wells' treatment system to cleanup the aquifer. Installation of higher efficiency equipment or modification of existing energy reducing equipment used in the treatment system.
- * Installation of additional monitoring wells, upgrading of existing wells, and continuation of routine sampling and analysis of the aquifer to monitor progress and provide early warning of potential new contaminants.

- * Excavation and removal of contaminated septic tanks and drain field piping to avoid the possible spread of contamination via uncontrolled excavation (i.e. future property development). The septic tanks were found to be bottomless, and, therefore, they were not removed.
- * Placement of administrative restrictions on the installation and use of groundwater wells and on excavation into the contaminated soils to minimize the potential for use of contaminated groundwater and reduce the risks associated with uncontrolled excavation.

An Amended ROD was signed on November 14, 1986. All of the selected remedies and administrative restrictions in the September 30, 1985 ROD for the aquifer unit remained the same. Additions or modifications to the soils unit cleanup were as follows:

- * Installation of an SVES covering the area of soil contamination over and around the historical drain field on-site to extract PERC from the remaining contaminated soil.
- * Reduction in the amount of septic tank contents to be removed and treated off-site. At that time, the capability of off-site disposal consistent with the CERCLA off-site policy was not available within Region 10 for the proposed 900 cubic yards of soil requiring removal, as called for in the original ROD. Therefore, contaminated solids and any water were removed from the septic tanks and disposed off-site. The remainder of the contaminated soil within the septic tanks and around the historical drain field was treated via SVES. During implementation of the remedy in the original ROD, the septic tanks were found to be bottomless, were left in place, and the soils treated via SVES.
- * Soil and vapor testing continued until soil treatment was deemed complete.

Establishment of cleanup goals for contaminants of concern were delayed in both the original ROD and Amended ROD. These documents recommended deferring establishment of the cleanup goals for contaminated soil and groundwater until a thorough evaluation of data, gathered during operation of the groundwater pump and treat system and the SVES, was conducted. EPA has determined that sufficient information has now been obtained to establish cleanup goals at the site for all contaminants of concern.

SIGNIFICANT DIFFERENCES AND BASIS FOR THEM

Excavation of remaining PERC-contaminated sludge:

Results from soil sampling conducted in October, 1990, following completion of soil remediation activities called for in the original ROD and Amended ROD, identified elevated concentrations of PERC at approximately 10-12 feet below ground surface within one of the bottomless septic tanks (ST-1) on Plaza Cleaners property. Field notes from the 1987 removal indicated that some sludge was left in ST-1 when efforts were made to remove the contents of the three (3) septic tanks. At the time of the removal, rice hull ash was added in an attempt to solidify the sludge in ST-1. Precipitation recharge probably infiltrated the sludge/ash material containing PERC, resulting in leachate movement downward to the underlying till and laterally and downward through the till to the water supply aquifer below. The soil sampling results, coupled with measurements of PERC concentration in the head space of the SVES wells and information contained in field notes, indicated that the elevated levels of PERC in soils were likely localized within and below the culpable tank at the site.

As part of the soil remedial action, high levels of PERC in soil in the vicinity of ST-1 needed to be reduced. An evaluation of two possible remedial alternatives was undertaken. The two potential remedies evaluated were: (1) SVES, and (2) excavation/treatment/off-site disposal.

The potential use of the SVES to remove PERC from the contaminated sludge in ST-1 was found to be dependent on the difference in permeability between the sludge material and the surrounding fill and native gravels. Although no value of permeability for sludge containing the rice hull ash thickener could be found in the literature, intuitively it is expected to be very low since the ash was added to thicken the sludge. No references to the use of SVES on low permeability soils could be found either, probably due to the fact that low permeability soils are, by definition, unsuitable for treatment via SVES.

Since the literature search did not provide permeability values for the rice hull ash (zorbital) and ash solidified material, extensive field testing would have been required to test the suitability of SVES as a treatment option. If the sludge was determined to have suitable permeability for treatment via the SVES, the system would require some modification in order to provide treatment at the specific location of the contaminated sludge and to accommodate any differences between sludge permeability and soil permeability for which the system was originally designed. Costs associated with SVES modification and the time required to verify the effectiveness of this technology

on rice hull ash-thickened sludge were both potentially significant.

The other alternative considered was excavation, treatment where necessary, and off-site disposal of the sludge. All contaminated soil and sludge exceeding 500 ppb would be excavated and treated via incineration if Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) levels were exceeded. Alternatively, if the contaminated material did not fail TCLP, it would be disposed at an approved RCRA hazardous waste facility. This alternative was considered more viable due to its technical practicability and feasibility, timeliness, and cost.

Implementation of the excavation alternative occurred during the months of June-July, 1992.

Ecology concurred with the implementation of this remedial action and participated in the review of design documents associated with this effort.

Establishment of cleanup goals:

Neither cleanup levels nor the point of compliance for soil and groundwater contamination were established in either the original ROD (September 30, 1985) or the Amended ROD (November 14, 1986), but were deferred until sufficient data demonstrating the effectiveness of the remedial actions were available. Therefore, via this ESD, EPA is establishing cleanup levels for contaminants of concern in both soils and groundwater in compliance with the original ROD and Amended ROD.

SOIL

PERC is the only contaminant of concern in soils at the Lakewood site. The Washington Model Toxics Control Act (MTCA) Cleanup Regulation Method A levels for PERC in both residential and industrial soils is 500 ppb.

Risk information was also factored into the selection of an appropriate cleanup goal for PERC in soil. A summary of health effects information from the RI for potential soil exposure pathways at the Lakewood site appears below:

Summary of Health Effects for Soil Exposure Pathways

<u>Potential Exposure to Soil</u>	<u>Increased Risk</u>	<u>Remark</u>
Ingestion of surface soil	not substantial	new, clean soil
Ingestion of subsurface soil	6×10^{-9} to 4×10^{-8}	500-3800ppbPERC
Inhalation of surface dust	not substantial	new, clean soil
Dermal contact/surface soil	not substantial	new, clean soil
Dermal contact/sub. soil	unquantifiable	no methodology
Inhalation of gases during excavation	26 times ACGIH TLV-TWA 2.5 times IDLH	max. soil conc. 3880ppb PERC; absolutely still air
	0.006 times ACGIH TLV-TWA	max. soil conc. 3880ppb PERC; 0.25mph wind speed

(ACGIH TLV-TWA: American Conference of Governmental-Industrial Hygienists Threshold Limit Value-Time Weighted Average
IDLH: Immediately Dangerous to Life or Health)

The risk values in the above table were based on PERC concentrations in soil prior to implementation of any soil-related remediation efforts.

EPA is establishing the cleanup level in unsaturated soil above the groundwater table at 500 ppb. This level is in compliance with state regulatory requirements, is within EPA's acceptable risk range of 10^{-4} to 10^{-6} , and will be protective of the groundwater. Site-wide, surface and subsurface soil concentrations based on existing data and confirmational sampling results following completion of the final soil remedial action in June-July 1992, are well below 500 ppb. Contaminated soil below the water table is being treated as part of the groundwater treatment unit.

Soil Standards

PERC

MTCA Method A	500 ppb
Recommended Cleanup Level	500 ppb

GROUNDWATER

PERC, TCE and 1,2-DCE are the contaminants of concern in groundwater at Lakewood. A review of current federal and state regulatory levels for these contaminants in groundwater yielded the following (in parts per billion):

<u>Groundwater Standards</u>	<u>PERC</u>	<u>TCE</u>	<u>1,2-DCE</u>
Federal MCLs	5.0	5.0	70.0
MTCA Method A (PERC, TCE)	5.0	5.0	----
MTCA Method B (cis-1,2 DCE)	---	---	80.0
Recommended Cleanup Level	5.0	5.0	70.0

(MCL=maximum contaminant level)

EPA is establishing the cleanup level for groundwater at 5.0 ppb for PERC and TCE, and 70.0 ppb 1,2-DCE consistent with the federal MCLs. These concentrations are as (or more) stringent than the Washington MTCA Method A and B regulatory requirements. Compliance with these cleanup goals is required throughout the contaminated groundwater plume.

Implementation of institutional controls:

In the original ROD and Amended ROD, provisions were included for the placement of administrative restrictions on:
 (1) the installation and use of drinking water wells to prohibit withdrawals of groundwater from the areas within the plume thus minimizing the potential for use of contaminated groundwater, and
 (2) on excavation into the contaminated soils to prevent the possible release of contaminants in the future, resulting from uncontrolled excavation on-site.

Residents whose properties overlie the existing groundwater contaminant plume currently obtain drinking water from the Lakewood Water District. Written reminders will be sent to these property owners, real estate offices and drilling contractors indicating the limitations on groundwater usage until cleanup goals in this media have been met.

Soil confirmation sampling results indicate that the final remedial action, conducted in June-July 1992, successfully reduced site-wide concentrations of PERC below the 500 ppb cleanup goal established in this ESD, eliminating the need for institutional controls on land use designed to prevent direct contact with contaminated soil.

SUPPORT AGENCY COMMENTS

Under MTCA, Ecology would usually elect to institutionalize the requirement not to drill into, or use untreated waters from, the contaminated plume via deed restrictions or local ordinance, for example. However, in this case Ecology recognizes that the original ROD and Amended ROD precede MTCA. The area is on a community water system of which this site is a part, and the contaminated groundwater is being treated and controlled by Lakewood Water District. Ecology, therefore, concurs with EPA's provision to provide written reminders indicating the limitations

current groundwater usage to the appropriate parties (particularly property owners and drillers). Public outreach and education, combined with ongoing groundwater treatment and monitoring, are considered adequate measures for the protection of human health and the environment.

AFFIRMATION OF STATUTORY DETERMINATIONS

Considering the new information developed during the remedial action and the resulting changes made to the selected remedy, EPA and Ecology believe that the remedy remains protective of human health and the environment. The revised remedy utilizes permanent solutions to the maximum extent practicable for this site and is cost-effective. It complies with the NCP and other federal and state requirements that are applicable or relevant and appropriate to this remedial action.

PUBLIC PARTICIPATION ACTIVITIES

This ESD, supporting information, and EPA's response to any comments from the public will be added to the Lakewood site file. For additional information regarding this ESD, please contact the Superfund Site Manager for the Lakewood site:

Ann Williamson
1200 6th Avenue, HW-113
Seattle, Washington 98101
(206) 553-2739 or
Toll-Free: 1-800-424-4372

Ann Williamson 9/15/92
Ann Williamson, Superfund Site Manager Date

Approved by:

Carol Rushin 9/15/92
Carol A. Rushin, Chief, Superfund Branch Date